Early Journal Content on JSTOR, Free to Anyone in the World

This article is one of nearly 500,000 scholarly works digitized and made freely available to everyone in the world by JSTOR.

Known as the Early Journal Content, this set of works include research articles, news, letters, and other writings published in more than 200 of the oldest leading academic journals. The works date from the mid-seventeenth to the early twentieth centuries.

We encourage people to read and share the Early Journal Content openly and to tell others that this resource exists. People may post this content online or redistribute in any way for non-commercial purposes.

Read more about Early Journal Content at http://about.jstor.org/participate-jstor/individuals/early-journal-content.

JSTOR is a digital library of academic journals, books, and primary source objects. JSTOR helps people discover, use, and build upon a wide range of content through a powerful research and teaching platform, and preserves this content for future generations. JSTOR is part of ITHAKA, a not-for-profit organization that also includes Ithaka S+R and Portico. For more information about JSTOR, please contact support@jstor.org.

NOTES ON SOME NORTH AMERICAN PHYLLACHORAS.

JOSEPH F. CLEVENGER.

During the past year I have critically examined a large number of specimens of several of the species of Phyllachora. At the suggestion of the Editor of the JOURNAL, I present here some of the more interesting notes made. The material used, most of it previously identified, belongs to the herbarium of the Ohio State University and to Professor Kellerman's private herbarium. All these and some additional specimens furnished by several botanists were kindly placed at my disposal. Much of the material apparently in good condition proved to be sterile or immature and consequently not so much was accomplished in the study of the genus as was anticipated in the beginning.

The genus Phyllachora belongs to the large family Dothideaceae, a group of the higher fungi. There are according to Lindau in Pflanzenfamilien 200 species of Phyllachora reported from the world, of which forty-four have been reported from North America and islands adjacent. Of these forty-four I have been able to examine material representing twenty-two species, though not all in condition favorable for most satisfactory study.

Plate 78 illunstrates in a general way the different types which have been described as Phyllachora, none of which seem to have been figured with the possible exception of Figs. 14-16.

It is to be noted that some species which have been described as Phyllachora have only conidiospores, as is illustrated by Fig. 13. Some show asci with only four ascospores, as is illustrated by Fig. 19. Others show asci with sixteen ascospores, see Fig. 30. In a few cases not heretofore reported I have found asci and ascospores.

This is only a preliminary report on the species of Phyllachora and it is intended to carry the work on in the future. Specimens, either determined or undetermined, are kindly solicited and may be sent to the Botanical Department of the Ohio State University, Columbus, Ohio.

The material examined was of course on dry leaves and stems of various plants and was prepared for examination by two methods, namely, imbedding in paraffine, and free hand sections. The imbedding was unlike the ordinary in that the material was softened in warm water from one to three hours and then left in a 10 per cent. solution of hydrofluoric acid from two to four days, treated with agar-agar, and finally imbedded in paraffine. The sections were stained on the slides in the ordinary way. The iron-alum haematoxylin stain gave the best results for general study. This method was most satisfactory in the study of the perithecia and of the structure of the stroma. In the study of the asci and ascospores the best results were obtained by selecting a mature stroma, teasing it apart on the slide and staining it with eosin.

NOTES ON SPECIES.

PHYLLACHORA TRIFOLII (Pers.) Fckl. Fig. 1-4. — This is found on several species of Trifolium. On Trifolium wormskioldii collected by E. B. Copeland at Montana Pt., California, were found mature asci and ascospores. The asci are cylindrical, 8-spores, (Fig. 3), ascospores uniseriate, oval, hyaline, 8-10 x 5-6 μ (Fig. 4).

Cooke, Grev. XIII: 63, states that the spores are 20 x 10 μ. Persoon, Synoposis, 30, did not report finding asci or ascospores. Neither did Fuckel in Symbolae Mycologicae report any asci or ascospores.

Further investigation may verify the great difference which seems to occur in the above descriptions. Since the descriptions coincide in the main, I believe the plants referred to are one and the same thing.

PHYLLACHORA AMBROSIAE (B. & C.) Sacc. Fig. 5-10. — This is found on several species of Ambrosia but generally immature or sterile. On Ambrosia psilostachya, collected by W. A. Kellerman at Manhattan, Kansas, Aug. 1889, asci were found containing eight ascospores. Ascospores uniseriate, elliptical, hyaline, 17 x 9 μ.

Cooke, in Grev. 4: 105, on Ambrosia artemisifolia and Ambrosia elatior, reports practically the same thing, only he says nothing about the number of ascospores in an ascus nor the size of the ascospores.

PHYLLACHORA DIPLOCARPA E. & E. Fig. 11-13. — This was named and described by J. B. Ellis and B. M. Everhart. At first they called it Homostegia diplocarpa, later because of the character of the stroma they changed it to Phyllachora diplocarpa, Bull. Torr. Bot. Club, 24: 135 and 292, 1897. They described it from material (on Distichlis maritima) collected by E. Bartholomew in Rooks Co., Kansas, Sept., 1895. They report finding two kinds of conidiospores, suballantoid, hyaline, 5-7 x 1-1½ μ; cylindrical nucleated spores, becoming 3-septate, 14-23 x 4-4½ μ.

In the same material sent to me by E. Bartholomew only the cylindrical 3-septate conidiospores were found.

This is one of the species of Phyllachora in which only conidiospores have been found.

PHYLLACHORA GRAMINIS (Pers.) Fckl. Fig. 14-16. — The speciment in question was found on Bouteloua oligostachya which was collected by E. Bartholomew at Stockton, Kansas, Oct. 1892.

It corresponds quite well with Fuckel's description in Symbolae Mycologicae, 219, except that the ascospores are larger. This does not seem to be sufficient reason for putting it anywhere else; Winter, in Die Pilze, gives the limitations such that it will include this. It has been found that different grasses show quite a variation in the character of the stroma and the size of the ascospores.

This species is one of the most common ones and is quite generally figured.

PHYLLACHORA LESPEDEZA (Schw.) Sacc. Fig. 17-19. — This is found occurring on different species of Lespedeza, although frequently immature. On Lespedeza repens, collected by W. A. Kellerman on the Gauley Mountains, W. Va., and Lespedeza capitata, collected by same at Manhattan, Kansas, were found mature asci and ascospores. The asci were clavate to cylindrical and *4-spored.* Ascospores ellipical, uniseriate to biseriate, hyaline, 12 x 7 μ.

Cooke, in Grev. 13:63, 1884, reports "ascis clavitit, sporidiis, ellipticis, continuis, hyalinis, .02 x .01 mm." Nowhere have I found any statement as to the number of ascospores in an ascus. The character of the stroma would place it in the genus Phyllachora.

The only difference in the stroma on the two host-species were: on Lespedeza capitata they were in circular patches; while those on Lespedeza repens were scattered over the leaf.

PHYLLACHORA CORNUOSPORA Atk. Fig. 21-24. — This species was named and described by Geo. F. Atkinson, Bull. Cornell Univ. 3:1897. He kindly sent some of the material to me and I found that it corresponded with his description, but I also found (which he does not mention) paraphyses present. This is included here because it shows a curved appendage at the large end of the ascospore representing a peculiarity which is not common. Besides, this species has not been figured before.

PHYLLACHORA JUNCI (Fr.) Fckl. Fig. 26-31. — This is found on Juncus effusa quite frequently, but is usually immature or sterile. Fuckel, Syhbolae Mycologicae, 216, states "sporidiis oblique monostichis, simplicibus, ovatis, biguttulatis, hyalinis, 12 mik. long., 6 mik. crass." Dr. Winter, Die Pilze, 900, gives "sporen schräg 1- oder 1-1½ reihig, oblong, mit undeutlichen septum (?) gelblich- oder grundlich-hyalin, 9-10 μ lang, 3—5.5 μ dick." Ellis and Everhart, North American Pyrenomycetes, 600, state the same thing as is found in Die Pilze. This was originally described as a Sphaeria by E. M. Fries in Systema Mycologicum, 2:428, as a Dothidea in Summa, 387. On Juncus effusa, collected by W. G. Farlow at Campbella, N. B., July, 1902, the general conditions in the material examined were found to be the same, while some of the details were very different. In only one instance did I find the specimen in good condition for study. Fig. 27 shows an immature ascus with eight spores as ordinarily seen. Fig. 28 shows a spore in which a constriction is beginning to form, and Fig. 29 shows the spore after it has divided and formed two spores. Fig 30 shows a mature ascus with *sixteen ascospores*. In no other species of Phyllachora did I find *more than eight spores* in an ascus. The sixteen ascospores seem to place it in another genus, but the character of the stroma would make it a Phyllachora. Material which had been collected in Ohio was either sterile or immature.

EXPLANATION OF PLATE 79.

A Leitz microscope with oculars 18 and 6 and objectives 7 and 3 were used in making the magnified drawings. The plate was made from the original drawings and reduced 2½ diameters.

For Figs. 4, 9, 13, 16, 19, 22, 23, 27, 28, 30 and 31 a No. 18 ocular and No. 7 objective were used, giving a magnification of 500 diameters.

For Figs. 3, 8, and 14 a No. 6 ocular and No. 3 objective were used, giving a magnification of 166 Diameters.

For Figs. 2, 7, 12, 17, 21, and 26 a No. 6 ocular and No. 3 objective were used, giving a magnification of 27 diameters.

Figs. 1, 5, 6, 11, 17, 20, and 25 showing hosts, are natural size unless otherwise indicated.

1–4. Phyllachora trifolii (Pers.) Fckl. on Trifolium wormskioldii.
1. Host plant natural size.
2. Cross section of leaf showing perithecia.
3. Ascus.
4. Ascospore.

Figs. 5–10. Phyllachora ambrosia (B. & C.) Sacc. on Ambrosia psilostachya.
5. Host plant natural size.
6. A piece of leaf magnified two diameters showing stroma.
7. Cross section of leaf showing perithecia.
8. Asci.
9. Ascospore.
10. Paraphyses.

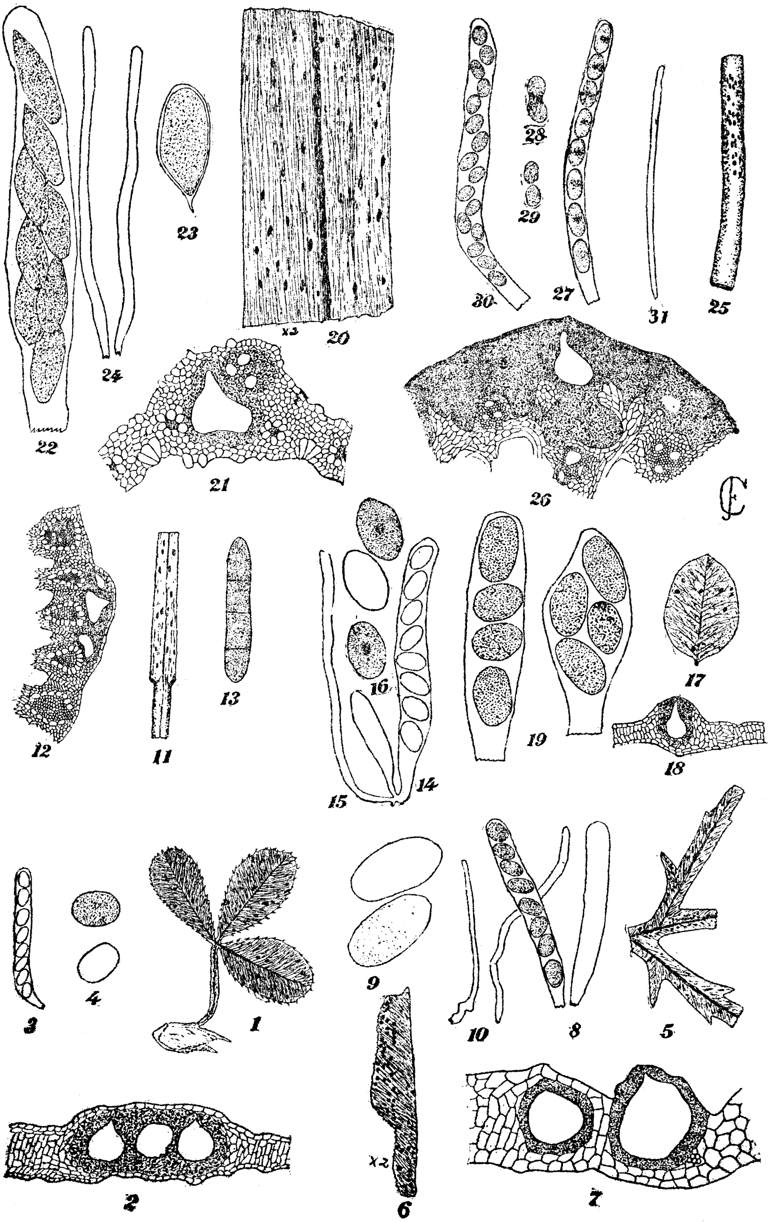
Figs. 11–13. Phyllachora diplocarpa E. & E. on Distichlis spicata.
11. Host plant natural size showing stroma on surface of leaf.
12. Cross section of leaf showing perithecia.
13. Conidiospore.

Figs. 14–16. Phyllachora graminis ? (Pers.) Fckl. on Bouteloua oligostachya showing how asci and paraphyses are fascicled (14–15).
14. A mature and an immature ascus.
15. Paraphysis.
16. Ascospores.

Figs. 17–19. Phyllachora lespedezae (Schw.) Sacc. on Lespedeza repens.
17. Leaf of host showing the stromata.
18. Cross section of leaf showing perithecium.
19. Asci containing ascospores.

Figs. 20–24. Phyllachora cornuospora Atk. on Panicum agrostoides.
20. Host plant magnified two diameters showing stroma.
21. Cross section of leaf showing perithecia.
22. Ascus containing ascospores.
23. Mature ascospores.
24. Paraphyses.

Plate 79.



ILLUSTRATIONS OF SOME PHYLLACHORAS

Figs. 25–31. Phyllachora junci (Fr.) Fuckel on Juncus effusa.
- 25. Host showing the stroma.
- 26. Cross section of stem of host showing perithecia.
- 27. Ascus showing ascospores before the last division in the spores.
- 28. Ascospores in process of dividing.
- 29. Ascospores after final division.
- 30. Ascus with sixteen ascospores.
- 31. Paraphysis.

BLACKSPOT CANKER AND BLACKSPOT APPLE ROT.

W. H. LAWRENCE.

Macrophoma curvispora Peck; Torry Bot. Club, Vol. 27, 21 Ja. 1900. Gloeosporium malicorticis Cordley; Bot. Gaz. Vol. 30, No. 1, p. 57, Jl. 1900. Myxosporium curvisporum (Peck) Sacc. in litt.

Blackspot Canker[1] fungus like bitter rot fungus causes a disease of both the tree and fruit. It differs from bitter rot, however, in that the canker stage does by far the greater amount of damage. This stage during the past few years has become very prevalent in the Maple Ridge and Mission districts of British Columbia and in Western Oregon and Western Washington in localities where the rainfall is considerable during the latter part of autumn and early winter.

In January, 1903, numerous decaying apples were found among stored fruit. A few pustules were present in some of the decaying areas. Later the epidermis overlying each pustule splits open exposing a central mass of creamy white spores. These spores were typical of the Blackspot Canker fungus except they were a little larger. Inoculations were made to determine the relation of the canker and rot. The fungus grown from decaying apples was placed in apple twigs with positive results. Spores taken from pustules in cankers placed on uninjured epidermis of the fruit also gave positive results in most cases.

The first indication of the presence of the fungus is a slight discoloration of the flesh of the apple just beneath the epidermis. The flesh becomes a light brown color and this is marked enough to be seen by the naked eye. As more flesh becomes involved the color becomes deeper brown. The epidermis makes a corresponding change in color. Decaying spots become depressed, dry and leathery. Pustules soon begin to make their appearance at the point of infection. The pustules are usually arranged in concentric circles about the point of infection — the more rapidly the

---

[1] Blackspot or Apple Canker; C. V. Piper, Ranch & Range, 8 Mr. 1900. Apple tree Anthracnos; A. B. Cordley, Bull. 60 Oregon Agr. Exp. Sta. Ja. 1900 and Bot. Gaz. Vol. 30, No. 1, p. 57, Jl. 1900. Blackspot Canker; W. H. Lawrence, Bull. 66 Wash. Agr. Exp. Sta. 1904.